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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/022,967	12/13/2001	Robert J. Falster	MEMC 98-6050 (2462.1)	7225

321 7590 09/03/2003

SENNIGER POWERS LEAVITT AND ROEDEL
ONE METROPOLITAN SQUARE
16TH FLOOR
ST LOUIS, MO 63102

EXAMINER

SCHILLINGER, LAURA M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 09/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/022,967

Applicant(s)

FALSTER, ROBERT J.

Examiner

Laura M Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-81 is/are pending in the application.
- 4a) Of the above claim(s) 28-81 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Election made in Paper No.6.

Election/Restrictions

Applicant's election of claims 1-27 in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 28-81 are withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Takada et al ('735).

In reference to claim 1, Takada teaches a method comprising:

a) subjecting the wafer to an oxide growth step to form an oxide layer having a thickness greater than 2 nm (Col.2, lines: 25-35);

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b) thinning the wafer by removing material from substantially the entire front surface to provide a thinned wafer having a thinned precipitate free zone (Col.s 2-3, lines: 40-12); and

c) polishing the front surface of the thinned wafer to a specular finish (Col.3, lines: 13-50).

In reference to claim 2-8 Takada teaches wherein the thickness of the thinned and polished wafer is at least about 10, 30, 15, 50 um thinner than the thickness of the wafer prior to the oxide growth step (Col.5, lines: 35-40, see also Table 1).

In reference to claim 17, Takada teaches wherein the polished wafer is used as a monitor wafer in at least one step of a semiconductor device fabrication process (Col.12, lines: 5-15).

In reference to claim 18, Takada teaches wherein a semiconductor device is formed in the device layer of the polished wafer (Col.1, lines: 15-30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 9-16 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada as applied to claims above, and further in view of Mule' Stagno et al ('039). Takada teaches a method for reclaiming silicon wafers by removing imperfections of the silicon substrate however Takada fails to teach the specific flaws which may occur on the substrate as Applicant claims below. Mule' Stagno teaches the specific flaws which are encountered with the crystalline structure of a silicon substrate and which are claimed by the Applicant. It would have been obvious to one of ordinary skill in the art to remove the substrate deficiencies taught by Mule' Stagno with the reclaiming process taught by Takada because Takada teaches his method may be used to accomplish such results (Col.2, lines: 25-60).

In reference to claim 9, Mule' Stagno teaches wherein the precipitate free zone extends from the front surface to the back surface of the wafer (Fig.5 and Col.11-12, lines: 45-15).

In reference to claim 13, Mule' Stagno teaches wherein prior to the oxidation step, the wafer contained oxygen precipitate nucleation centers between the central plane and the precipitate free zone (Fig.5 and Col.11-12, lines: 45-15).

In reference to claim 14, Mule' Stagno teaches wherein the wafer further comprises a first axially symmetric region which is substantially free of agglomerated intrinsic point defects (Fig.6)

In reference to claim 15, Mule' Stagno teaches wherein the first axially symmetric region is a region in which vacancies are the predominant intrinsic point defect (Fig.4 (8))

In reference to claim 16, Mule'Stagno teaches wherein the wafer further comprises a second axially symmetric region in which Si self-interstitial atoms are the predominant intrinsic point defect and which is substantially free of agglomerated Si self-interstitial instrinsic point defects (Fig.8).

In reference to claim 19, Mule'Stagno teaches wherein prior to step (a) the wafer has a non-uniform distribution of crystal lattice vacancies with the peak concentration of vacancies being at a maximum at a distance of at least 20 um form the front surface of the wafer (Fig.31).

In reference to claim 20, Mule'Stagno teaches wherein prior to step (a) the wafer has a non-uniform distribution of crystal lattice vacancies with the peak concentration of vacancies being at a maximum at a distance of at least 30 um form the front surface of the wafer (Fig.31).

In reference to claim 21, Mule'Stagno teaches wherein prior to step (a) the wafer has a non-uniform distribution of crystal lattice vacancies with the peak concentration of vacancies being at a maximum at a distance of at least 40 um form the front surface of the wafer (Fig.31).

In reference to claim 22, Mule'Stagno teaches wherein prior to step (a) the wafer has a non-uniform distribution of crystal lattice vacancies with the peak concentration of vacancies being at a maximum at a distance of at least 50 um form the front surface of the wafer (Fig.31).

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In reference to claim 23, Mule' Stagno teaches wherein the wafer has a concentration of oxygen which is less than 9 PPMA (Col.11, lines: 30-40).

In reference to claim 24, Mule' Stagno teaches wherein the wafer has a concentration of oxygen which is less than 8 PPMA (Col.11, lines: 30-40).

Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al('735).

In reference to claims 25-27, Takada teaches forming an oxide film (Col.2, lines: 25-35) however fails to recite the thickness ranges as claimed in claims 25-27 wherein an oxide layer having a thickness of at least 3, 25, and 50nm is grown on the front surface of the wafer in step (a) however these claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA 1988) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead, Jr. can be reached on (703) 308-4940. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

LMS


CARL WHITEHEAD, JR.
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